how a few of them might become lost at any camping place, and how they might germinate there by natural means.

It is true that all the floral districts of the earth contain plants the migratory introduction of which has been caused by the agency of man. As a rule, those plants are self-perpetuated in their new habitats by their unimpaired function of reproduction; and if they have lost that function from any cause their preservation is due to man's intervention for his own benefit. In the case of the papaw here mentioned its vegetative growth has extended far beyond its fruiting limits, a condition which savage man could have no interest in preserving. His gambling habit seems, therefore, to have been the accidental cause of that part of the dispersion of the papaw which it would not have attained by merely natural causes.

CHARLES A. WHITE.
SMITHSONIAN INSTITUTION,
April 21, 1906.

THE PARASITISM OF NEOCOSMOSPORA.

A WILT disease was discovered by the writer in the ginseng gardens of Missouri in the summer of 1904, which proved to be caused by the fungus *Neocosmospora vasinfecta* var. *nivea* Sm. The fungus has been studied and described in a bulletin soon to be issued by the Missouri Agricultural Experiment Station. In the course of the investigation several new facts were ascertained concerning the parasitism of the fungus, which may properly be mentioned in this place.

The characters of this fungus have been studied principally by Atkinson and Smith. The former[1] first described the fungus in 1892, believing it to be a species of *Fusarium*. He stated the belief that it was a weak parasite, since it usually infected only such plants as had been previously attacked by another disease. Smith,[2] in 1899, published a detailed account of the entire life history of the fungus, giving it the name *Neocosmospora vasinfecta*. He found that there were three distinct physiological varieties which attacked cotton, watermelons and cow-peas, respectively, and that cross-inoculations always failed. In contrast to Atkinson's assumption, Smith stated that all three varieties were parasitic, and especially the variety *nivea*.

Although I failed to obtain the perithecia, yet in all other respects the ginseng fungus agreed with the variety *nivea* (the watermelon fungus of Smith). The results related in the bulletin soon to be issued go far toward establishing Atkinson's theory that *Neocosmospora* is a weak parasite and only attacks plants which are first weakened by the presence of another fungus.

The facts upon which this conclusion is based are as follows: (1) In the field the wilt disease never appeared except where the ginseng plants had been previously attacked by an anthracnose. (2) Plants which were sprayed with the Bordeaux spraying mixture (and consequently free from anthracnose) were not attacked by *Neocosmospora*. (3) Watermelon seeds were planted in crocks of rich garden earth which certainly contained microorganisms, but had never been infected with *Neocosmospora*. Each crock received a test-tube culture of *Neocosmospora* at the time of planting seeds and three weeks later the melon seedlings were attacked by the wilt fungus. Microscopical examination of the wilted seedlings showed the pink mycelium and spores of *Neocosmospora* in the fibrovascular bundles of the hypocotyls. Other crocks filled with the same kind of soil were sterilized by steam in an autoclave. When cool they each received a tube culture of *Neocosmospora* and were planted with watermelon seeds. The wilt fungus grew abundantly in the sterilized soil, but at the expiration of twelve weeks none of the watermelon plants showed the slightest indication of the wilt disease.

These facts are interpreted to mean that *Neocosmospora* itself is a weak parasite, but when associated (as it usually is) with other fungi, *e. g., Rhizoctonia, Pythium,* etc., it gains entrance into the watermelon plant. In the case of ginseng, its entrance seems to depend upon an anthracnose caused by *Vermicularia Dematium*.

[1] Bul. 41, Alabama Agr. Exp. Sta., 1892.

[2] Bul. 17, Div. Veg. Phys. and Pathol., U. S. Dept. Agr., 1899.

Smith's experiments with *Neocosmospora* employed soil which was uninfected by that fungus, but apparently was not sterilized, and he states that *Thielavia basicola* was present in some of the experiments. To this fact I am inclined to refer the apparent active parasitism which he found. At any rate, the form which I have isolated from the ginseng plant has not shown active parasitism.

Howard S. Reed.

Botanical Laboratory,
University of Missouri,
March 15, 1906.

Effects of an Unbalanced Ration.

In 1904 an obscure disease affected the fruit of certain trees in the orchard of the Maine Agricultural Experiment Station. No similar trouble had previously come under the notice of the writer, and this note is made simply as a matter of record. A careful study of the cause of the condition described is being carried on at the present time.

In August, when about the size of walnuts, the fruits began to crack and drop. Marked indentations, somewhat similar to those made by curculio, were abundant. No evidence of insect work could be discovered, however. When the fruit was opened the tissue under the indented parts was found to be dry and brown. Most of the fruits ceased to grow, and by the first of September the larger part of it was on the ground; though early in the season all of the trees were loaded. The leaves, however, appeared perfectly healthy.

At the time of harvesting, October 10, most of the trees had lost all of their fruit. Such as remained on some of the trees was usually small and deformed; some was of medium size with one side cracked; and a small portion was without blemish. In all cases, however, the texture of the fruit was soft and spongy—about as might be expected in April or May. The surface of the fruit was also characteristic; there being numerous minute elevated 'pimples,' corresponding to the grayish dots on the fruit. This feature was so noticeable that the workmen spoke of it in handling the fruit after removal to the cellar.

Though a small portion of the fruit was on the tree at harvest time, it dropped so easily that no attempt was made to save it for packing. The slightest jarring of the limbs would cause it to fall.

The reason for the condition above indicated is, as already noted, very obscure. A careful microscopic examination was made without finding evidence of any fungous enemy, even in the brown dry tissue above mentioned. It was then observed that the condition existed only with certain trees included in a fertilizer experiment, in which an excess of available nitrogen is applied every year. The first tree noticed was on the plat receiving nitrate of soda and acid phosphate. Later it was found that every tree on the plat, as also on the adjoining plat which received nitrate only, was affected as described. In one or two instances check trees, which adjoined the nitrate plat, showed a tendency in this direction. None of the other trees in the whole orchard, however, gave the slightest indication of the trouble. The trees on a plat given muriate of potash and acid phosphate, and on another given muriate only, separated from the first by but a single row of trees, were perfectly normal.

The supposition was made, therefore, that the trouble was physiological and due to the excessive amount of available nitrogen and the lack of potash. Of course this is a matter of conjecture and can be settled only by definite and careful experiment.

The outcome of a further study of this problem may be of interest and importance in connection with the rational fertilization of orchards.

W. M. Munson.

University of Maine.

Notes on Organic Chemistry.

The Action of Ozone on Organic Compounds.

Since the discovery of ozone by Schoenbein, in 1840, many chemists have examined its action on organic compounds, but, hitherto, with very limited success. When a reaction did take place it resulted, almost always, in the formation of carbon dioxide and water, or in the production of highly explosive sub-